

the Cubes of the apertures of the Object-Glasses; and thence to make Telescopes of various lengths, magnify with equal distinctness, the apertures of the Object-Glasses, and the Charges or magnifying Powers, ought to be as the Cubes of the square Roots of their lengths; which doth not answer to Experience. But the errors of the Rays arising from the different refrangibility, are as the apertures of the Object-Glasses, and thence to make Telescopes of various lengths, magnify with equal distinctness, their apertures and charges ought to be as the square Roots of their lengths; and this answers to experience as is well known. For instance, a Telescope of 64 Feet in length, with an aperture of $2\frac{2}{3}$ Inches, magnifies about 120 times, with as much distinctness as one of a Foot in length, with $\frac{1}{3}$ of an Inch aperture, magnifies 15 times.

Now were it not for this different refrangibility of Rays, Telescopes might be brought to a greater Perfection than we have yet described, by composing the Object-Glass of two Glasses with Water between them. Let ADFC represent the Object-Glass composed of two Glasses ABED and BEFC, alike convex on the outsides AGD and CHF, and alike concave on the insides BME, BNE, with Water in the concavity BMEN. Let the Sine of Incidence out of Glass into Air be as I to R and out of Water into Air as K to R, and by consequence out of Glass into Water, as I to K: and let the Diameter of the Sphere to which the convex sides AGD and CHF are ground be D, and the Diameter of the Sphere to which the concave sides BME and BNE are ground be to D, as the Cube Root of KK—KI to the Cube Root of RK—RI: and the Refractions on the concave sides of the Glasses, will very much correct the Errors of the Refractions on the convex sides, so far as they arise from the sphericalness of the Figure. And by this means might

Fig. 28.

might Telescopes not for the difference by reason of this other means of increase than that of increase contrivance of A very long Tubes managed, and bend, and shake trembling in the see them distinctly are readily managed on a strong upright

Seeing therefore lengths by Refraction Perspective by re a concave Metal the Metal was ground and by consequence Inches and a quarter and the Diameter ground was about sequence it magnified other way of measuring 35 times. The and a third part; opaque Circle, covered but by an opaque Eye, and perforated for the Rays to pass by being placed behind which otherwise was comparing it with a